



Center for Advanced
Energy Studies

*A research
partnership between
Boise State University,
Idaho National
Laboratory, Idaho
State University and
University of Idaho.*

Center for Advanced Energy Studies

Environment, Safety, and Health (ES&H) Refresher Training

January 30, 2012



Director's Message:

CY 2011 was a very productive year for CAES, with over \$18M awarded in competitive research and other funds. During the year we were able to make significant progress in equipping our laboratories, executing important research, and in converting four of our laboratories either partially or fully to radiological-controlled areas. A lot has been accomplished in a short period of time and I encourage you to visit the CAES portal and read the [CAES 2011 Annual Report](#).

I am especially proud to inform you that our accomplishments were achieved safely, with one minor injury to a person who stubbed their toe while packing some boxes. While CAES has a sound set of procedures, processes, and training that ensure we perform work consistently and safely, I firmly believe that people are our first, last, and most important defense against undesirable things occurring that adversely affect the environment, equipment, and most importantly - people.

Thanks for your safe attitudes and behaviors in the labs, office areas, and at home and for making sure equipment and the environment are treated with respect and pride.

While we are proud and thankful for a safe year, it was not without some near misses that had the potential for serious consequences. We need to make sure we continue to learn from our own mistakes as well as those of others, and improve our processes so they enable productive and safe research and office work.

The CAES leadership and operations team developed the 2012 ES&H refresher training with the expectations that each person takes time to reflect on their safety and to learn from others. Also, the training serves as a vehicle for communicating some interesting things on the horizon for CAES in 2012.

I assure you that the refresher training is both valuable and informative. Please take time to reflect on and to use this information to help you and your colleagues conduct work productively and safely.

Thanks for being part of the CAES team.

Sincerely,

JW "Bill" Rogers, Director

Annual ES&H Refresher Overview

- Reflection on Near Misses – what happened and what we learned
- What's on the horizon in 2012
- U.S. Chemical Safety Board Video

CAES 2011 Near Misses

- What Have We Learned
 - Don't take unsafe shortcuts even for one-time tasks – the risk is still there!
 - Always pay attention and stay focused – people can always make a difference!

Near Miss Expectations

- **What is a Near Miss?** A procedural violation or personnel error or action that occurred and could have caused serious personnel injury or equipment damage, affected facility safety, or caused environmental damage.
- **An opportunity to LEARN!** When a near miss occurs it is important that we take timely actions to learn from the event through understanding why it occurred to prevent a reoccurrence and protect researchers.

Near Miss Expectations (cont.)

- **Remember Your Responsibilities When a Near Miss Occurs**
 - **Researcher:** Stop Work. Secure the work location and report the event to the CAES Safety Officer (CSO), Laboratory Lead, and your Principal Investigator.
 - **CSO and Lab Lead:** Determine what, if any, institutional reporting requirements apply and report accordingly. The institutions that need to be considered are ISU and the researcher's home organization.
 - **CSO and Lab Lead:** Conduct an inquiry using a graded approach based on the actual and potential consequences of the near miss. Determine why the near miss happened, what actions (if any) are needed before work is resumed, and to whom and how to communicate lessons learned.

Event Summaries

- **Electrical near miss:** A temperature controller was being integrated into a test platform when a thermocouple providing input to the instrument contacted the metal edge of a fume hood. On contact, the metal sheath of the thermocouple caused an electrical short that tripped the breaker feeding the outlet. The temperature controller was not a commercial off the shelf instrument, but was comprised of commercially available components. On grounding, the breaker supporting the plug was tripped. The student researcher sought help in resetting the breaker from a member of the CAES operations staff, and subsequently the work evolution was stopped until a clear understanding of the event was available.
- On event investigation, it was determined that a wrench being used to hold a resistive heater in place such that the thermocouple could be tested contacted an exposed terminal on the heater causing the metal table on which the experiment was being conducted to become energized. The system grounded out as the metal sheath of the thermocouple contacted the metal edge of a fume hood.

Event Summaries (cont.)

- **Lessons Learned:**
 - **Stop Work is an acquired attitude:** The researcher planned to continue work after resetting the breaker, as opposed to stopping work, reporting the near miss to the principal investigator and the CAES Safety Officer, and assessing what happened and why.
 - **Altered risk perception because a task was “one-time.”:** The researcher is competent and normally executes work in a safe manner. However, the researcher decided to use the wrench (an electrical conducting device) to secure the resistive heater because it was a one-time need; the electrical tape that would normally be used was not in the work location.

Event Summaries (cont.)

- **Lessons Learned (cont.)**
 - **Improvement is needed in identification of electrical hazards and defining electrical work researchers may perform:** The team had received verbal approval from CAES ES&H and Operations to perform set up and evaluation of the equipment and apparatus required to perform work. CAES ES&H and Operation team identified a deficiency in their process for evaluating electrical work. They determined that minimum training requirements and expectations to perform electrical work need to be defined for CAES research. Expectations and boundaries for what electrical work researchers can perform and cannot perform need to be defined and communicated to research staff generically and on a project-specific basis (e.g. energized circuits, wires, or terminals are not to be exposed).

Event Summaries (cont.)

- **Chemical Near Miss:** Facilities personnel found two sample bottles in the parking lot by the loading dock. One of the samples was leaking onto the asphalt and the liquid was bubbling.
- **Lessons Learned:**
 - **Pay more attention to detail:** In this instance, how samples are packaged and transported including ensuring the samples are adequately secured in the container. As a result of this incident, the researcher changed his transport method and does not use boxes with any type of hole in the bottom. Furthermore, he carefully inspects the transport areas to make sure no samples are left behind.
 - **Timely notification:** Facilities staff awareness of their surroundings and timely notification of appropriate ES&H staff was a good practice.

Event Summaries (cont.)

- **Heavy Lifting Near Miss:** A researcher inadvertently removed the pin that holds the arm for a manual lift in place, resulting in an unexpected release of the arm to the ground.
- **Lessons Learned:**
 - **Mind on Task:** This was the first time the person was using the piece of equipment and they simply were not focused on the task at hand.

Coming in 2012: CAES Research and Operations

- **Spark Plasma Sintering 2:** This SPS has a glovebox attached to enable processing of radioactive materials. We believe it is the only one of its kind in the world and has a multitude of applications for materials, space nuclear, reactor, advanced armor and other types of applications.
- **Radiochemistry Laboratory:** With its evolving mission, the entire lab will become a radiologically controlled area.
- **Faster turnaround for project approvals:** The operations team is committed to further streamlining of the research project approval process.

Coming in 2012: CAES Research and Operations

- **Laser capabilities:** Two lasers will be installed in the radiochemistry lab. Anyone can request access/use of the lasers to support CAES research.
- **User Facility Model:** Major equipment will continue to be made available to researchers based on a standard use fee. This will allow the equipment to be used as much as possible and to provide funding for its maintenance.

U.S. Chemical Safety Board Video

- The CAES ES&H annual refresher concludes with a compelling video on three events that involved graduate students and professors and occurred at three U.S. academic institutions. The events highlight many valuable lessons learned that are relevant to CAES research that include:
 - Maintain a questioning attitude using the available resources, e.g., CSO, lab lead, and principal investigator
 - Always know what is required and use the appropriate personal protection equipment when performing research
 - Document in your project plan, fully understand, and perform research within the approved operating envelope –e.g., types and quantity limits of chemicals and radionuclides, pressure and temperature ranges, etc.
 - Fully understand both exposure and physical hazards associated with chemicals.
- After you view the video (click on the title above) ask yourself how you are making sure these types of things don't happen do you.

Thanks for taking time to reflect on
your safety and for keeping CAES
a safe place to work.